DOCUMENT RESUME

ED 452 626 EC 308 383

AUTHOR Stough, Laura M.; Palmer, Douglas J.; Sharp, Amy N.
TITLE Teachers' Reflections on Special Education Students' Cognitions: An Expert-Novice Comparison.
PUB DATE 2001-02-00
NOTE 14p.; Paper presented at the Annual Meeting of the Southwest Educational Research Association (24th, New Orleans, LA, February 1-3, 2001).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Observation Techniques; Classroom Techniques; *Disabilities; Educational Strategies; Elementary Secondary Education; Higher Education; Knowledge Base for Teaching; *Master Teachers; *Reflective Teaching; *Special Education Teachers; *Student Teachers
IDENTIFIERS *Expert Novice Paradigm

ABSTRACT

This study, part of a larger study on special education teacher expertise, compared the instructional decision making of expert and novice special education teachers in familiar instructional settings to determine differences in the allocation of attention to different instructional themes. Participants were 19 expert special education teachers and 19 student teachers majoring in special education. Two one-hour videotapes were made of each teacher in the classroom, observations were made in conjunction with each videotaping session, and stimulated recall procedures were used to obtain teachers' reflections about the process videotaped. Teacher reflections were coded into 11 categories which fell under three conceptual themes: (1) teacher on-line assessment of students, (2) teachers' tacit knowledge of students, and (3) classroom strategies. Expert teachers reflected significantly more often than did novices concerning student "state of mind," students' prior knowledge, and students' typical behavior patterns. Expert teachers strategically and reflectively applied a variety of instructional interventions that were based on both their background knowledge and the information they gathered during instruction. Experts expressed significantly more comments about instructional strategies and collaboration/consultation than did novices, but the two groups did not differ in regard to the behavioral, monitoring, or management strategies mentioned. (Contains 30 references.) (DB)

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Teachers' Reflections on Special Education Students' Cognitions:

An Expert-Novice Comparison

Laura M. Stough, Ph.D.

Douglas J. Palmer, Ph.D.

Amy N. Sharp, M.Ed.

Department of Educational Psychology

Texas A&M University

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Sharp

Paper presented at the annual meeting of the Southwest Educational Research Association
New Orleans, Louisiana
February 2001

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Expertise is generally defined as superior knowledge and skill within a specific domain (e.g., Chase & Simon, 1973; Chi, Feltovich & Glaser, 1981; Ericsson & Smith, 1991; Glaser & Chi, 1988). Experts have been found to perceive meaningful patterns in their area of expertise, to be faster than novices at performing a task, and to have superior short-term and long-term memory about events (Glaser & Chi, 1988). Researchers have also fruitfully used the construct of expertise to examine the knowledge that superior teachers possess (e.g., Berliner, 1986; Borko & Livingston, 1989; Carter, Cushing, Sabers, Stein, & Berliner, 1988; Peterson & Comeaux, 1987). Research on teachers in general classroom settings suggests that expert teachers possess more knowledge about classroom practice than do novices and that this domain knowledge is organized differently than that of novices (Borko & Livingston, 1989; Sabers, Cushing, and Berliner, 1991). Expert teachers also seem to make judgments about students differently, (Leinhardt, 1983; Stader, Colyar, & Berliner, 1990) and pay attention to specific information about students when planning and implementing their lessons (Carter & Doyle, 1987; Strahan, 1989).

Limited research has been conducted on the expertise of special education teachers. This gap in the research literature on is particularly notable, as it would seem that teacher cognition within special education settings would be particularly complex. Special education teachers continuously must adjust their teaching techniques because of the need to modify instruction for their students with learning problems (Algozzine, Morsink, & Algozzine, 1988; Englert, 1983), which suggests that these teachers are required to have a large knowledge base of effective strategies that they apply in the classroom. Similarly, while research on novice teachers has been conducted (see Berliner, 1986; 1987) there have been no investigations of novice teachers of learners with special needs.

In this study, which was part of a larger study on special education teacher expertise, we compared the instructional-decision making of expert and novice special education teachers in familiar instructional settings. Our purpose was to determine if these two groups of teachers differed in how they allocated attention to different instructional themes in the classroom.

Method

Participants

Participants were nineteen expert special education teachers and nineteen student teachers. The student teachers were special education majors enrolled in a student teaching seminar at a large southwestern university. Most of these students were in their early 20's and simultaneously completing their bachelor's degree in addition to the requirements for obtaining state teacher certification in the area of special education. Eighteen of the students were female, while one was male. Fourteen of the student teachers were teaching in classrooms in a mid-sized city, while three of them taught in an urban area, and the remaining two in a rural setting.

The expert teachers were certified special education teachers from urban, mid-size, and rural school districts. Special education supervisors in each of these districts were asked to nominate teachers who 1) had at least five years of teaching experience, 2) were recognized among their peers, parents, or the community as being effective teachers, 3) instructed students that generally made excellent progress in achieving their individualized education plan (IEP) objectives, and 4) were generally viewed by their supervisors as superior special education teachers. We chose a minimum of five years of teaching experience as, according to Berliner (1987) experience is a necessary, although not sufficient, condition for developing teacher expertise. We chose professional group membership, namely certification as a special education teacher, as it is another method by which expertise has been defined (see Chi, Feltovich, & Glaser, 1981; Groen & Patel, 1988). Finally, we asked a select group, special education supervisors, to nominate individuals as "experts" as nomination is method that also has been frequently used by other researchers in the area of teacher expertise (see Berliner, 1986; 1987; Bartelheim & Evans, 1993). In addition, principals of the nominated teachers were asked to confirm or disagree with these nominations. We added this criterion as a confirmatory check on our identification of these nominated teachers as experts.

Procedure

All participating student teachers completed an initial survey in order to obtain descriptive data about their past teaching experiences and about their knowledge of their assigned student teaching classroom. As the expert teachers had more extensive and varied classroom experiences, they were interviewed and asked a standard series of questions about their classroom experiences and teaching philosophy.

Videotaping. Two one-hour videotapes were made of each teacher instructing students in her classroom. Both expert teachers and student teachers were asked to select an instructional sequence and content area in which they felt that they were particularly skilled in delivering instruction. The expert teachers scheduled videotapes of these sessions, however, student teachers were not videotaped until they had been teaching in their classroom for at least two months. Approximately two hours of videotape was used per teacher for a total of 76 hours of videotape.

Observations. Observations were made in conjunction with each videotaping session. Notes were made concerning the number of students in the classroom, ratio of male to female students, ethnicity of the students, content area taught, grade level, and if adults other than the teacher were present in the classroom. A map was made of the classroom and the seating location of all students was noted. Observational notes were used to identify events that might elicit instructional reflections from the teachers, such as prolonged exchanges with students or transitions from one instructional activity to another.

Stimulated recall procedure. A stimulated recall procedure (Ericsson & Simon, 1984) was used to obtain these teachers' reflections about the instructional sequence that had been videotaped. This procedure replicated that used by other researchers in the field of teacher cognition (e.g., Peterson & Comeaux, 1987) in that the teachers were asked to recall, to the extent possible, their thoughts and emotions during the classroom sequence. While researchers occasionally prompted comments from teachers (e.g., "What were you thinking here?") efforts were made to minimize researcher comments

while maximizing opportunities for comment by the participants. All comments by the researcher and the teacher were simultaneously recorded on audiotape. Approximately forty-five minutes of audiotape was obtained per recall session for a total of fifty-seven hours of audiotape across all teachers. Recall sessions occurred within forty-eight hours after the instructional sequence in order to more effectively elicit the teachers' interactive decision-making.

Field notes. Immediately after each contact with a teacher, researchers completed field notes in which they recorded technical notes (problems in collecting the data, special considerations for their subsequent contact with a particular teacher), analytical notes (analytical and conceptual reflections) and their general observations (the mood and tone of the session). Approximately two pages of notes were made for each teacher.

Memberchecks. A second interview was used at the end of the stimulated recall sessions and after preliminary coding to verify the results of the preliminary analysis of the stimulated recall sessions conducted with each teacher. These interviews lasted approximately 30 minutes, however, as the analysis of each teacher's transcripts was individualized, the nature and length of these second interviews varied. Overwhelmingly, the majority of teachers agreed with the categories that the researchers had identified with their initial interpretations.

Analysis

All stimulated recall recordings from the teachers were transcribed. Approximately 1,520 transcribed pages were generated from these 38 teachers. An earlier qualitative analysis of the data (cf. Stough, Palmer, & Leyva, 1999) illustrated that there were differences in the ways in which novice and special educators thought about and responded to instructional events in the classroom. In order to compare quantitatively the responses of these two groups, a content analysis of each stimulated recall transcript was completed. As part of this procedure, the text of each transcript was divided into thought-units. Each of these units was then sorted into one of the categories that had emerged as part

of the qualitative analysis. At the end of analyzing two stimulated recall transcripts from each teacher, the number of comments falling into each category was tallied and summed.

Results

For the purposes of this paper, we will focus on our quantitative content analysis of the stimulated recall transcripts obtained from the two groups of teachers. A total of 6,080 thought-units were coded for the 19 student teachers, for an average number of 320 statements per student teacher. A total of 6,460 units were coded for the 19 expert teachers in the intervention group, for an average number of 340 comments per expert teacher. The difference between these averages was not significant. Using categories developed through our earlier qualitative analysis of the data (Stough & Palmer, 1998) thought-units were sorted into one of 33 discrete categories. T-tests for equality of means were conducted to compare the results from the novices to those of the experts for each category. The results from 11 of these categories, which are the focus of this paper, can be found in Table 1. These 11 categories fell under three conceptual themes: 1) teacher on-line assessment of students, 2) teachers' tacit knowledge of students, and 3) classroom strategies.

Teacher On-Line Assessment

Teachers closely observed the behavior and attention level of their students in the classroom. When students indicated problems in the successful completion of a task, teachers used their tacit knowledge of that student, along with their observations of that student's current behavior in the classroom, to assess the student's ability to successfully engage in the task. The goal of this assessment was to form a hypothesis about the student's immediate learning state or "state of mind." This "state of mind" hypothesis guided the teacher in subsequently selecting a strategy to assist the student.

Student behavior and attention. Reflections by teachers included comments about student behavior that they had observed in the classroom and upon the level of attention that students were displaying. Teachers focused on students' actions, behaviors, and level of attention while simultaneously delivering instruction and managing the classroom action. Comments by teachers that

referred to current student behavior and attention were coded as "student behavior/attention" and were tallied across transcripts from both the expert and the novice teachers. While, on average, expert teachers commented more often (mean=41.37) than did novices (mean=36.11) this difference was not significant.

Student state of mind. A related category was teachers' hypotheses about the "state of mind" of their students. These deductions were also "in the moment," and were not necessarily based on behaviors that could be interpreted by the research. Teachers appeared to form a hypothesis about their students' "state of mind" based upon the knowledge base that they had about the student and usually engaged in this type of reflection when a student was encountering difficulties. Expert teachers in our study made significantly more reflective comments about students' "state of mind" than did novices ($t=2.956$, $p=.005$).

Teacher Knowledge about Student Characteristics

This conceptual theme included teachers' reflections on students' typical areas of learning difficulties as well as how and under what circumstances students typically learned best. Teachers' knowledge about their students' learning characteristics seemed to come from the teacher's shared history with the student and from their direct observation of their students. This knowledge subsequently was used when selecting instructional interventions for their students. We coded comments about student characteristics into three categories: prior knowledge, behavioral patterns, and general knowledge (other).

Prior knowledge. Teachers reflected often upon their students' prior knowledge: They seemed to monitor the exposure students had had to particular content and what concepts they had mastered. Teachers monitored the prior knowledge of their students and commented on how this knowledge affected students' achievement in the classroom. As a regular part of their lessons, teachers in this study reminded their students of previously introduced material and then attempted to integrate new

material with the prior knowledge of their students. Expert teachers in this study commented on their students' prior knowledge significantly more than did our novice teachers (t=5.921; p=.000).

Behavioral patterns. Teachers commented on their past experiences with students and what the typical behavior they expected to see from students. This knowledge, again, was based on repeated experiences with specific students. Often, teachers' knowledge in this area seemed to influence strategies that they would chose to use with a specific students. Expert teachers in our study commented significantly more frequently on this category than did novice teachers (t=3.533, p=.001).

General student characteristics. Teacher comments that fell into this category include those about the students' home environment, their diagnostic category, any health history of the student, and on the typical learning pattern of the student. This information seemed to be used by teachers to select the most appropriate instructional strategies for their students. Expert teachers did not make significantly different comments than did student teachers in this category.

Strategies

Teachers used a variety of strategies to respond to student needs in their classrooms. They seemed to select these strategies based upon their observations of student behavior and the subsequent assessment that they had made about the "state of mind" of their students. These strategies included those that were instructional, managerial, planning/preparatory, monitoring, behavioral, or collaborative/consultative.

Instructional strategies. Teachers in our study described strategies that included: repetition of material, reinforcing students for correct performance, modeling, and scaffolding students' learning. Teachers typically used instructional strategies that were accessible through different sensory modalities or strategically presented the information in different formats. Experts mentioned instructional strategies significantly more than did novices (t=2.190; p=.035).

Classroom management. The category of classroom management included the procedures and routines that the teacher established for her students. This management appeared to be a strategy that

teachers used to proactively prevent behavioral problems in the classroom. Included in the category of classroom management were teacher reflections upon the school rules, the routine of the classroom, and the overall classroom environment. There was no significant difference in reflections on classroom management by expert and novices in this study.

Behavioral strategies. Teachers in this study used a wide variety of behavioral strategies. While teachers used reactive strategies as changing their tone of voice or using proximity control, their behavioral strategies were frequently positive in tone, and included strategies such as encouraging a student, using praise, or motivational strategies. Behavioral strategies were occasionally overt, such as directly modeling the desired student behavior or talking directly to a student about his or her behavior. Teachers in this study seemed to become concerned about student behavior in the classroom when they believed that this behavior affected a) the teacher's ability to deliver instruction, or b) the ability of the students to learn. There was no significant difference between novices and experts in this category.

Monitoring. Teachers also monitored the attention levels and behavior of their class as a whole and, when needed, implement strategies to increase the focus of their class. Close monitoring of student attention and behavior served, in part, to assist teachers in anticipating learning and behavioral problems. There was no significant difference between novices and experts in this category.

Planning/preparation: Teachers prepared for instruction as a strategy by which to increase student academic and behavioral outcomes. They mentioned this strategy less frequently than the other categories of strategies but clearly used planning or preparation to enhance positive outcomes. There was, however, no difference in the frequency of reflections in this area.

Collaboration/consultation: Collaboration and consultation was another less frequently mentioned strategy but was also used to enhance student outcomes. Teachers referred to interactions that they had with general and other special educators to attempt to resolve or prevent difficulties in

the classroom. Expert teachers made significantly more references to this category ($t=3.259$, $p=.003$) than did novices.

Discussion

In their 1986 chapter entitled "Teachers' Thought Processes" Clark and Peterson summarized the findings of studies on the content of teachers' interactive thoughts. They reported "in all of the six studies, the greatest percentage of teachers' reports of interactive thoughts were concerned with the learner" (p. 269). While teachers in these studies also mentioned thoughts about objectives, content matter, and instructional processes, most of the time teachers thought about what student understood and how they were responding to instruction. This finding was also the case with both of our groups of special education teachers: Their reflections included references to the prior knowledge, preferences, behavioral patterns, learning ability, emotionality, and diagnostic categories of their students.

Experts in this study, however, reflected significantly more often than did novices in a number of categories that we have highlighted. While reflects upon observable student behavior and attention levels did not significantly differ in the two groups, comments about student "state of mind," the on-line assessment of students' learning state did differ. As the ability to make "state of mind" reflections seemed to be based, in part, upon the knowledge base that these teachers held about their students, it seems logical that teacher who had had more experience with their students would have a larger knowledge base upon which to make these kinds of assessments than would novices. Analysis of categories related to teacher knowledge showed that expert teachers focused significantly more on their students' prior knowledge and typical pattern of behavior than did novices. Teachers' ongoing data collection, along with their constant reflection upon their superior knowledge base, appears to have strongly guided their instructional decision-making.

Teachers strategically and reflectively applied a variety of instructional interventions that were based on both the background knowledge that teachers possessed and the information that they gathered during instruction. Experts displayed significantly more comments about instructional

strategies and collaboration/consultation than did novices, however they did not appear to differ from novices with regard to the behavioral, monitoring, or management strategies that they mentioned. It should be noted, however, that our analysis in this study focused upon the amount of comments made that fell into particular categories, not the content of these comments. It may be the case that comments by novice focused on teachers' inability or dissatisfaction with using particular strategies- which would account for the lack of difference between experts and novices in some categories.

Implications

Teacher preparation programs have placed increasing emphasis on the importance of teacher reflection. Teachers who engage in reflective practice think critically about their own teaching, inquire about the nature of effective teaching, and develop "reflective capacities of observation, analysis, interpretation, and decision making" (Doyle, 1990). We are currently using our data on the expert teachers described in this study to attempt to transfer expertise to student teachers via a seminar for student teachers. We believe that the study of expertise is valuable, but more important is the issue of developing expertise in novice teachers. We have found in previous studies (Stough & Palmer, 1996) that stimulated recall and collegial reflection increases self-reflection, while it circumvents the problem of automatically in expert educators. Second, we have found that when teachers in the field have the opportunity to reflect on their teaching, such as in the stimulated recall procedure we have described, they find the procedure useful in analyzing their teaching.

Teacher educators should also consider the use of our modified stimulated recall procedure as an appropriate intervention in their training of preservice teachers. This technique is easily implemented, requiring a minimum of supervision on the part of the teacher educator, while producing a maximum of opportunity for reflective thought by the student teacher. Sessions may be audio taped and reviewed by teacher educators at a later date, if desired, and thus give important insights into how preservice teachers cognitively process their own teaching.

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Independent Samples Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Student Behavior	Equal variances assumed	.914	36	.367	5.26
	Equal variances not assumed	.914	35.009	.367	5.26
State of Mind	Equal variances assumed	2.956	36	.005	16.37
	Equal variances not assumed	2.956	30.742	.006	16.37
Student Prior Knowledge	Equal variances assumed	5.921	36	.000	8.95
	Equal variances not assumed	5.921	28.134	.000	8.95
Student Behavior Pattern	Equal variances assumed	3.533	36	.001	9.95
	Equal variances not assumed	3.533	35.904	.001	9.95
Student Characteristics	Equal variances assumed	1.955	36	.058	6.84
	Equal variances not assumed	1.955	34.019	.059	6.84
Planning and Preparation	Equal variances assumed	.354	36	.725	.32
	Equal variances not assumed	.354	35.242	.725	.32
Classroom Management	Equal variances assumed	.739	36	.465	4.11
	Equal variances not assumed	.739	34.436	.465	4.11
Instructional Strategies	Equal variances assumed	2.190	36	.035	14.58
	Equal variances not assumed	2.190	34.484	.035	14.58
Monitoring	Equal variances assumed	-.206	36	.838	-.79
	Equal variances not assumed	-.206	32.954	.838	-.79
Behavior Strategies	Equal variances assumed	.858	36	.397	5.84
	Equal variances not assumed	.858	35.768	.397	5.84
Collaboration and Consultation	Equal variances assumed	3.259	36	.002	4.26
	Equal variances not assumed	3.259	23.943	.003	4.26